

6.18 Example R: Ellipsoidal Inclusions

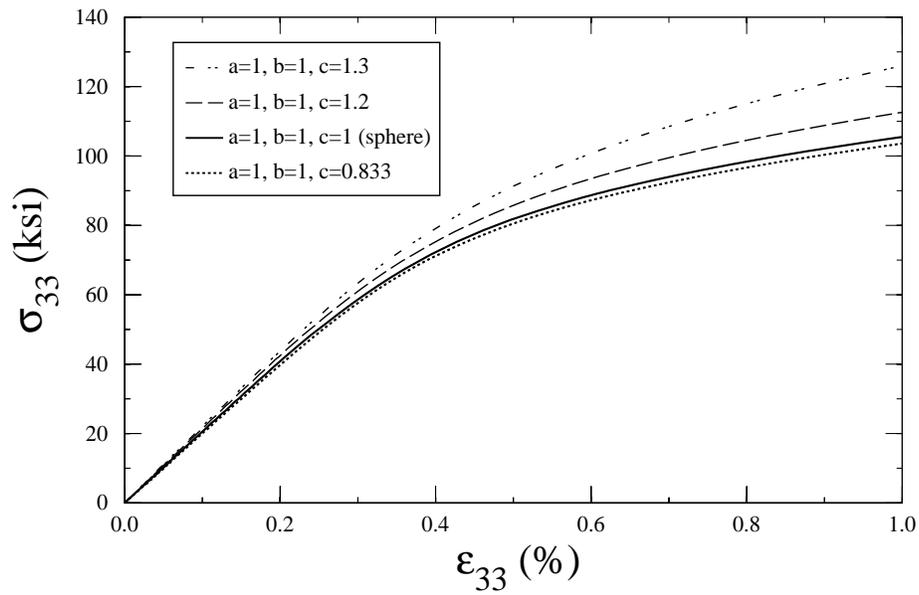
Sample Input File for Ellipsoidal Inclusions

Problem Summary

Load Type:	Thermomechanical
Load Direction:	33
Load History:	Monotonic
Load Control:	Strain
Load History Data:	Hold temperature during mechanical loading $\dot{\epsilon}=6.667 \times 10^{-5}$ /sec, $\epsilon_{max}=0.01$, $\epsilon_{min}=0$. $T = 427$ °C; $\Delta t_{initial} = 0.01$ sec.
Micromechanics Model:	Triple Periodicity
Repeating Unit Cell:	Ellipsoidal Inclusion RVE (IDP=4) $a = 1$, $b = 1$, $c = 1.3$, $d/h = 1$, $l/h = 1$
Integration Algorithm:	Predictor/Corrector
Constituent Material Model:	Fiber: Elastic Matrix:TGVIPS
Constituents:	Fiber: SCS-6 Matrix:Ti-6-4

```
*PRINT
  NPL=1 %
*LOAD
  LCON=3 LOP=3 LSS=1 %
*MECH
  NPTW=2 TI=0.0, 150.0 LO=0.0, 0.01 %
*THERM
  NPTT=2 TI=0.0, 150.0 TE=427.0, 427.0 %
*MODEL
  MOD=2 %
*SOLVER
  NTF=2 ISTM=0.01 ISTT=5. ERR=0.01 %
*FIBER
  NFIBS=1
  NF=1 MF=6 NDPT=2 MAT=E %
*MATRIX
  NMATX=1
  NM=1 MM=7 NDPT=2 MAT=A D=1.0, 1.0, 1.0 %
*MRVE
  IDP=4
  OPT=2 VF=0.3 A=1 B=1 C=1.3 RD=1 RL=1 %
# OPT=2 VF=0.3 A=1 B=1 C=1.2 RD=1 RL=1 %
# OPT=2 VF=0.3 A=1 B=1 C=1. RD=1 RL=1 %
# OPT=2 VF=0.3 A=1 B=1 C=0.83333 RD=1 RL=1 %
*CURVE
  NP=1 %
*MACRO
  NT=1
  NC=1 X=3 Y=9 NAM=ellipsoid %
*END
```

☞ **Note:** To generate the four curves shown in the plot, change which line does not start with “#” under *MRVE



Results of Discontinuously reinforced composite with 30% volume fraction of ellipsoidal inclusions

👉 **Note:** As the ellipsoidal inclusion becomes longer and thinner (i.e., increasing c) and thus more fiber-like, the response becomes stiffer.